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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/734,721	12/13/2000	Seiji Umemoto	20530	3363

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EXAMINER

RAHLL, JERRY T

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 05/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/734,721

Applicant(s)

UMEMOTO, SEIJI

Examiner

Jerry T Rahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment 'D' received 16 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-20 and 22-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-20, 22-26 and 28 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9 and 11 is/are rejected.
- 7) ☒ Claim(s) 6, 10 and 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,835,661 to Tai et al.
3. Tai et al. describes a plane light source comprising a plane light pipe having upper and lower and side incidence surfaces, a linear light pipe having a light supply surface, and a point light source disposed on the linear light pipe. The light from the point light source is converted into light of a linear light source by the linear light pipe, which is disposed to make the light supply surface of the linear light pipe the incidence side surface of the plane light pipe and convert the linear light from the linear light pipe into light of a plane light source by means of the plane light pipe (see Figures 1, 3a-3f and 6-8d, Col 3 Lns 22-32, Col 5 Ln 8-Col 6 Ln 33, Col 8 Lns 15-43 and Col 12 Ln 44-Col 13 Ln 51). Tai et al. does not describe the refractive index of the linear light pipe as being greater than that of the plane light pipe. However, it is well-known in the art that the light incident on a surface of an area having a lower refractive at a large angle would be reflected back. Therefore, it would have been obvious to one of ordinary skill in the art to use a higher refractive index for the plane light pipe to allow for the light in the linear pipe to propagate the length of the pipe via reflections and be distributed to the plane light pipe from the prismsed surface of the linear light pipe.

4. Tai et al. further describes the plane light pipe as including a light output means on the lower surface and the linear light pipe as being a rod-like member made of at least six sides and an optical path changing means on the front surface inclined in the front-rear direction at an angle of 42.5 degrees.
5. Tai et al. further describes the linear light source as made of a rectangular parallelepiped having optical path changing means in a surface opposite the light supply surface with sloped inclined in the front-rear direction.
6. Tai et al. further describes light output means of the plane light pipe having ridgelines parallel to the incidence side surface.
7. Tai et al. further describes the plane light source as being used with a liquid crystal display.
8. Claims 5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tai et al. as applied to claims 1-2 above, and further in view of U.S. Patent No. 5,727,107 to Umemoto et al (submitted by applicant).
9. Tai et al. describes the plane light source as described in paragraphs 6-11, above. Tai et al. does not describe the light output means of the planar light pipe as constituted by a repetitive structure of prismatic structures having a combination of short and long side surfaces. Umemoto et al. describes light output means of a planar light pipe as including slopes facing the incidence side at an inclination from 35 to 45 degrees and flat surfaces inclined at an angle of not larger than 10 degrees (see Figures 1-14 and Col 6 Ln 6-Col 9 Ln 6). Umemoto et al. also describes the repetitive structures at intervals of a pitch from 50 μm to 1.5mm. Since the Umemoto et al. and Tai et al. devices are similar in design and function, it would have been obvious to one of

ordinary skill in the art to use the light output means described by Umemoto et al. with the plane light source described by Tai et al.

10. Umemoto et al. further describes the projected width of each of the slopes as smaller than 40 μm .

Response to Arguments

11. The Applicant argues that there would be no motivation to modify the Tai et al. device as suggested in the Examiner's rejection due to the fact that Tai et al. does not deal with light rays having a large incidence angle. While this holds true when the beam collector acts as a collimator, it would hold true when the beam collector does not act as a collimator, as describes in Column 5, Lines 32-34. When the beam collector does not act as a collimator, the effect of rays having a large incidence angle must be considered and it would have been obvious to one of ordinary skill in the art to make the obvious changes discussed above.

12. The Applicant argues that Tai et al. provides a clear teaching that the materials of the various optical elements should be the same. In Column 13, Tai et al. discusses materials for the prisms to match the light pipes they are fitted to. This has no bearing on the materials of the different light pipes since the prisms are meant to freely direct light within the material of their respective light pipes. In Column 14, Tai et al. discusses the materials used for the embodiment having an adhesive between the light pipes. The fact that the light pipes have the same refractive index for this embodiment does not teach away from the light pipes having different refractive indices for different embodiments (such as that shown in Figure 6 of Tai et al.). If anything, it shows the desired index difference at the emission surface of the linear light pipe, suggesting the obvious change discussed above.

13. Without patentable amendment of the claims, the next office action will be made final.

Allowable Subject Matter

14. Claims 13-20, 22-26 and 28 are allowed.

15. Claims 6, 10 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claims 13-20 and 22-26 describe a plane light source comprising a plane light pipe having upper and lower and side incidence surfaces, a linear light pipe having a light supply surface, and a point light source disposed on the linear light pipe. The light from the point light source is converted into light of a linear light source by the linear light pipe, which is disposed to make the light supply surface of the linear light pipe the incidence side surface of the plane light pipe and convert the linear light from the linear light pipe into light of a plane light source by means of the plane light pipe. The plane light pipe includes light output means in either the upper or lower surface to make light incident on the incidence side surface outputted from the other of the upper or lower side surface. The light output means of the plane light pipe is described as having ridge lines inclined with respect to the incidence side surface.

17. Claims 6 and 28 describe a plane light source comprising a plane light pipe having upper and lower and side incidence surfaces, a linear light pipe having a light supply surface, and a point light source disposed on the linear light pipe. The light from the point light source is converted into light of a linear light source by the linear light pipe, which is disposed to make the light supply surface of the linear light pipe the incidence side surface of the plane light pipe and convert the linear light from the linear light pipe into light of a plane light source by means of the

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plane light pipe. The plane light pipe includes light output means in either the upper or lower surface to make light incident on the incidence side surface outputted from the other of the upper or lower side surface. The light output means of the plane light pipe is made up of a repetitive structure of prismatic structures disposed at a pitch from 50 μm to 1.5 mm, the short side of each prismatic structure having a slope at an inclination angle of 35 to 45 degrees, the long side of each prismatic structure having a slope at an inclination angle of 0 to 10 degrees and the inclination angle difference is no larger than 5 degrees and the inclination angle difference between adjacent long sides is not larger than 1 degree on a whole surface of the plane light pipe so that the projected area of the long side surfaces on the reference plane is not smaller than 8 times as large as the projected area of the short side surface.

18. Claims 10 and 27 describe the plane light pipe having a refractive index between 1.45 and 1.54 and the linear light pipe having a refractive index between 1.55 and 1.65.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry T Rahll whose telephone number is (703) 306-0031. The examiner can normally be reached on M-F (8:00-5:30), with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (703) 308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

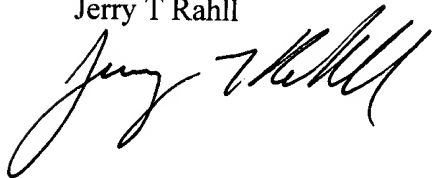
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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Jerry T Rahll

A handwritten signature in cursive script, appearing to read "Jerry T Rahll".A handwritten signature in cursive script, appearing to read "AKM Enayet Ullah".

AKM ENAYET ULLAH
PRIMARY EXAMINER